

A NEW SPECIES OF PSOCULUS FROM KENYA WITH NOTES ON
RELATIONSHIPS OF THE PSOCULIDAE (PSOCOPTERA)

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ABSTRACT—*Psoculus ricei* n. sp. is described from Kenya. It is the 2nd species of its genus and family, and the 1st in which males are known. Male morphology tends to confirm Roesler's (1954) conclusion that the Psoculidae are most closely related to the Mesopsocidae.

In October 1966, I collected psocids at several localities in Kenya. While collecting on the eastern shore of Lake Naivasha, I found representatives of a small species with wingless females and winged males. These insects were living under webs about 2 cm in greatest dimension on trunks of fever trees (*Acacia xanthophloea*). Later microscopic examination proved them to be a species of *Psoculus*, different from the type, *P. neglectus* (Roesler). The latter species was hitherto the only one known for its genus and family. It was first recorded in the Mecklenburg area of Germany (Roesler, 1935), and was later found in France (Roesler, 1954). It is exclusively parthenogenetic (Roesler, 1954), males being totally unknown. My find, then, of a second species which was bisexual and African was of considerable interest.

In this paper I describe the new species and discuss systematic relationships of *Psoculus*.

MATERIALS AND METHODS

The material consists of 3 males, 12 females, and 4 nymphs of the new species. I have not obtained specimens of *P. neglectus*, and comparisons are here made with published descriptions of that species.

Measurements (Table I) were taken only on specimens permanently slide-mounted (1 male and 2 females). The measurements are in microns and have an error of $\pm 0.27 \mu$. Abbreviations for measurements are as follows: A = antennal length; Fw = forewing length; T = posterior tibial length; t_1 , t_2 = length of 1st and 2nd posterior tarsomeres; IO/D = least distance between compound eyes in dorsal view divided by greatest antero-posterior diameter of compound eye in same view; PO = greatest transverse diameter of compound eye in dorsal view divided by greatest antero-posterior diameter of compound eye in same view.

Psoculus ricei Mockford, new species

Diagnosis: Female differing from *P. neglectus* as follows: 1) pigmented area of subgenital plate with anterior margin decidedly concave; 2) posterior projection of subgenital plate bearing few setae; 3) 1st valvula with its distal protuberance more elongate, slender.

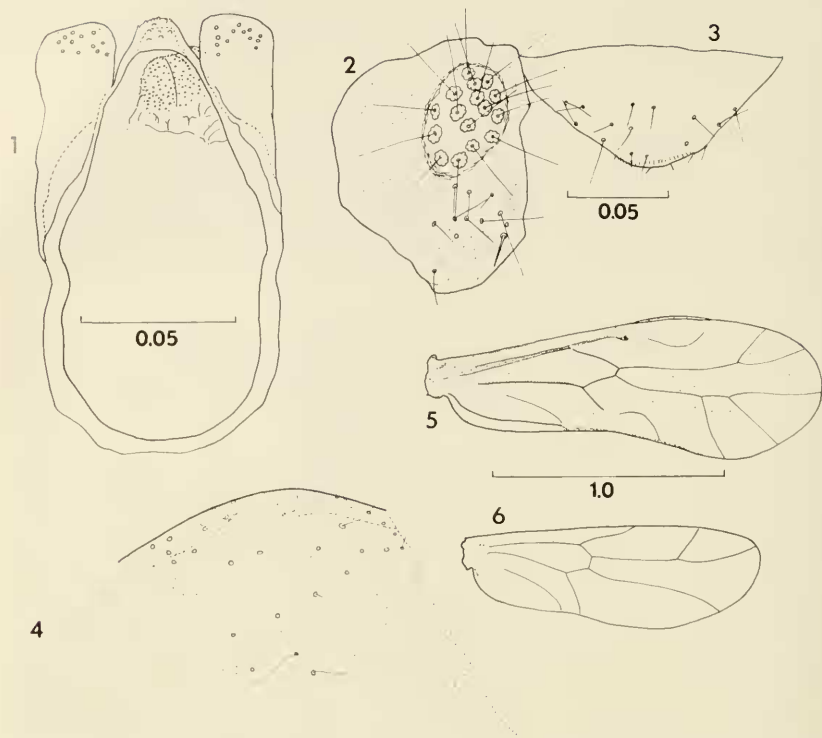


Fig. 1-6. *Psoculus ricei* n. sp. ♂. Scales in mm. 1, Phallosome. 2, Left paraproct. 3, Epiproct. 4, Hypandrium (scale of fig. 2 and 3). 5, Forewing. 6, Hindwing.

and tapering toward tip; 4) 2nd valvula with its distal protuberance tapering toward tip; 5) distal end of 2nd valvula extending decidedly beyond protuberance; 6) 3rd valvula more rounded.

Male: Measurements (Table I).

Morphology: Macropterous. Ocelli present, well separated. Median ecdysial line present from posterior margin of vertex nearly but not quite to ocellar interval, its lateral arms absent. Compound eyes relatively larger and with more facets

Table I. Measurements and Head Ratios of *Psoculus ricei* n. sp.

	A	Fw	T	t_1	t_2	IO/D	PO
♂ (holotype)	728	1649	407	96	75	2.21	0.58
♀ (allotype)	561	—	329	79	77	3.57	0.46
♀ (paratype)	567	—	331	77	77	—	—

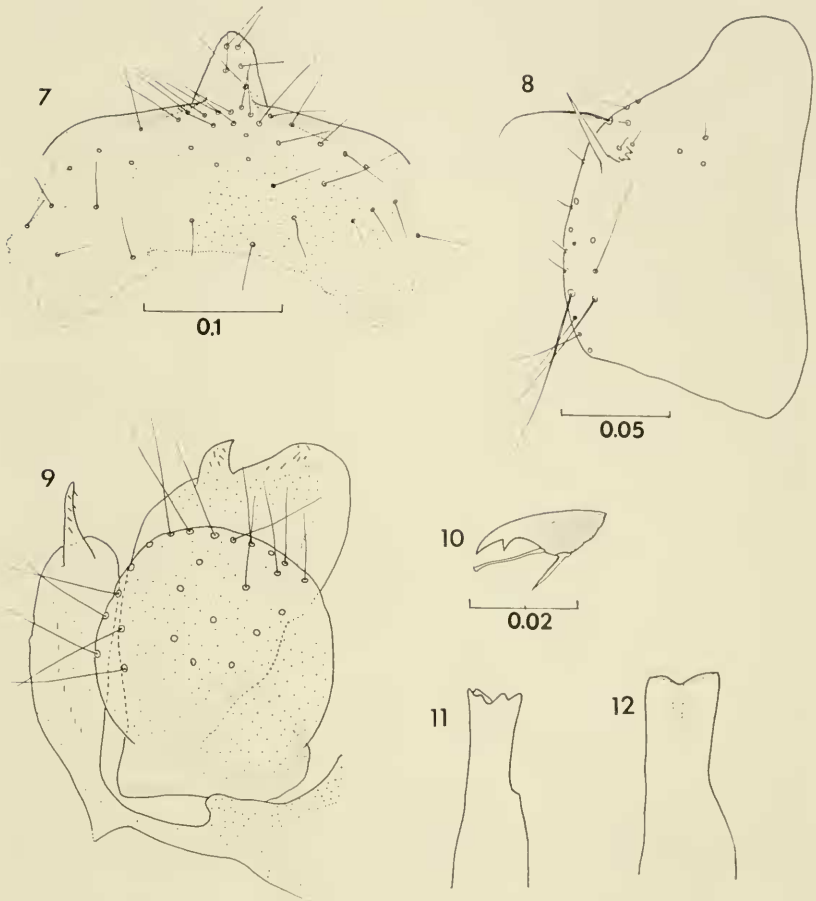


Fig. 7-12. *Psoculus ricei* n. sp. ♂ and ♀. 7, Subgenital plate (♀). 8, Left Paraproct (♀). 9, Gonapophyses (♀, scale of fig. 8). 10, Pretarsal claw (♂). 11, Lacinial tip (♂, scale of fig. 10). 12, Lacinial tip (♀, scale of fig. 10).

than in female. Lacinial tip (fig. 11) with raised median and lateral edges, 2 denticles near median edge and 1 near lateral edge. Labrum with a pair of short stylets anteriorly toward lateral margins. Thorax of normal macropterous form. Legs relatively short. Rasp of Pearman's organ present on hind coxa but mirror absent. Pretarsal claws as in fig. 10. Wings unciliated. Forewing (fig. 5) with free cubital loop; pterostigma rounded posteriorly and with a heavy anterior margin. Rs and M in both forewing and hindwing (fig. 6) joined by a crossvein. Phallosome (fig. 1) with external parameres broad, blunt apically; aedeagal arch wide in middle, bearing minute tubercles; endophallus bearing numerous minute denticles, the mass apparently divided medially. Hyandrium (fig. 4) rounded distally with numerous minute setae on inner surface near distal margin; notched

laterally, external surface sparsely setose. Paraproct (fig. 2) with a well defined sense cushion bearing 16 trichobothria in specimen examined. Epiproct (fig. 3) sparsely setose, with a row of minute denticles on distal margin.

Color (in alcohol): Compound eyes black. A large purple spot around each ocellus, the spots not convergent. Head, thorax, and appendages yellowish brown. Wings clear, unmarked, the veins yellowish brown. Preclunial abdominal segments white, faintly ringed with purple. Clunium, subgenital plate, epiproct, and paraprocts yellowish brown.

Female: Measurements (Table I).

Morphology: Apterous and otherwise neotenic. Lacinial tip (fig. 12) cleft medially, without denticles. Subgenital plate (fig. 7) and gonapophyses (fig. 9) as described in diagnosis. Paraproct (fig. 8) completely lacking sense cushion; sparsely ciliated on and near posterior margin, bearing a long spine and a minute duplex spine near posterior margin. Epiproct broad, rounded posteriorly.

Color (in alcohol): Compound eyes black. Head, sclerotized portions of thorax, legs, terminal abdominal segments and their appendages medium reddish brown, the abdominal segments paler ventrally than dorsally. Membranous portions of thorax dull creamy white. Intersegmental membranes of abdomen narrowly indicated by broken creamy-white lines.

Nymphs: Resembling adults in body form. Late instar male nymphs with rounded wing pads and ocelli indicated by 3 black spots on vertex. Nymphs of both sexes with compound eyes black, body and appendages dull creamy white. Female nymphs with slight indication of reddish brown on preclunial abdominal segments.

Type-locality.—Kenya: Rift Valley District: Naivasha, 10 Oct. 1966, on trunks of fever trees, holotype ♂, allotype ♀, 2 ♂, and 11 ♀ paratypes and 4 nymphs. Types are in my collection.

This species is named for my long-time friend Mr. Dale W. Rice, who was with me when this species was taken and who made most of the arrangements for our East African journey. Mr. Rice is best known for his scientific contributions in marine mammalogy.

DISCUSSION

Psoculus was erected by Roesler (1954) for a species which he had earlier (1935) called *Reuterella neglecta*. Later, that author realized that the species was not closely related to *Reuterella* and (1954) he concluded that it is most closely related to the Mesopsocidae but shows similarities to the Philotarsidae and Peripsocidae. He placed it in a family of its own.

In considering the systematic relationships of Psoculidae, I follow the classification of Badonnel (1951) modified by restriction of Peripsocidae to include only the genera *Peripsocus* and *Kaestneriella*.

Characters available for determining the systematic relationships of Psoculidae consist at present only of external morphological features. Female characters affected by neoteny (absence of wings, ocelli, and paraproctal sense cushions; retention of duplex paraproctal

Table II. Comparison of characters in Psoculidae, Peripsocidae, Mesopsocidae, Philotarsidae, and Elipsocidae. Positive and negative signs mean presence or absence of the stated character.

	Psoculidae	Peripsocidae	Mesopsocidae	Philotarsidae	Elipsocidae
Lacinal tip shape	Flattened, denticulate or not	Bicuspid	Bicuspid	Bicuspid	Variable
Wing ciliation	-	±	-	+	±
R-M junction (forewing)	crossvein	fused	fused, point, crossvein	fused	fused
Cu _{1a} present	+	-	+	+	±
Hypandrium notched laterally	+	-	+	±	+
Pore-bearing parameres external	+	-	+	+	+
Aedeagal arch tuberculate	+	-	±	-	-
Endophallus with large sclerites	-	+	-	±	-
Distal process on first valvula	+	-	+	-	-
Subapical process on second valvula	+	-	+	-	-
Female paraproct broader than long	+	-	+	-	-

spines) may help to mark out the group as a distinct phylogenetic line, but they cannot be used to show affinity. Presence of only 2 tarsomeres in Psoculidae may be also neotenic, although it is expressed in both sexes. Characters shared with all or nearly all other families of Suborder Psocomorpha are of no value.

In Table II, Psoculidae and 4 families which have been thought to be related to it are compared in 11 characters which seem to be of taxonomic value. The similarity in these characters between Psoculidae and Mesopsocidae is far greater than between Psoculidae and any of the other families.

Unique features of the Psoculidae which mark them as distinct from the Mesopsocidae include the following: 1) tarsi 2-segmented; extreme neoteny of the female (no wing pads, no sense cushions of paraproct, stout distal spine and duplex spine persistent on paraproct); 2) well-developed r-m crossvein in both forewing and hindwing of male; 3) external parameres broad, not narrowing at their tips; 4) pigmented area of female subgenital plate broad antero-posteriorly.

If the Psoculids prove to be primarily African there will be a biogeographic basis as well as a morphological one for the conclusion that they are most closely related to the Mesopsocidae, because the early evolution of the Mesopsocids appears to have been African. Of the 3 living genera, 2 (*Ilexacyrtoma* and *Labocoria*) are known only from Africa, while *Mesopsocus* appears to have its greatest diversity in Africa. The Psoculids are probably an early branch from a stem shared only with the Mesopsocids.

REFERENCES

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**A NEW SYNONYM IN *POTAMANTHUS*
(EPHEMEROPTERA: POTAMANTHIDAE)**

A. H. Morgan (1913, Ann. Entomol. Soc. Amer. 6:412) was first to refer the name *Potamanthus bettini* (only as figure captions) to figures of a whole dorsal view and the mandibles of a larval specimen of *Potamanthus*. This designation is interpreted to conform to the meaning of "indication" as referred to in Article 12 and delineated in Article 16 (a) (vii) of the International Code of Zoological Nomenclature (1964), and therefore, the name cannot be considered a nomen nudum. All other criteria for availability, as established in the "Code," have been met. There is reasonable circumstantial evidence to believe that the species name was intended to be patronymic for Cornelius Betten (thus, a possible incorrect spelling). Such cannot be proven, however.

J. G. Needham (1920, Bull. Bur. Fish. 36:287) and F. P. Ide (1935, Can. Entomol. 77:119) suggested that Morgan's (1913) published figures actually referred to *Potamanthus flavcola* (Walsh). J. H. McDunnough (1926, Can. Entomol. 58:185) synonymized *P. flavcola* with *Potamanthus verticis* (Say), and *P. verticis* has been almost unanimously recognized by workers as the senior synonym since that time.

Comparative study of the larvae of North American *Potamanthus* species has indicated that Morgan's figures do indeed refer to *P. verticis*, and I therefore formally designate *P. bettini* to be a junior synonym of *P. verticis*: *Potamanthus bettini* Morgan [= *Potamanthus verticis* (Say)], NEW SYNONYM.

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